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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/718,319	11/21/2000	Stephen Yuen	4704/USA/ETCH/SILICON	3056

32588 7590 07/30/2003

APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER

GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 07/30/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09-718,319

Applicant(s)

Guen et al

Examiner

George Goudreau

Group Art Unit

1763

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☒ Responsive to communication(s) filed on 5-03 (i.e. - papers # 12-13)
- ☐ This action is FINAL.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-25, 34-38, 51-70 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1-25, 34-38, 51-56, 59-70 is/are rejected.
- ☒ Claim(s) 57-58 is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some* ☐ None of the:
 - ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 12
- ☐ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

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15. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.

16. This action will not be made final due to the new grounds of rejection.

17. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

18. Claims 1-3, 6-25, 34-38, 51-56, and 59-70 are rejected under 35 U.S.C. 102(e) as being anticipated by Tao et. al. (6,037,266).

Tao et. al. disclose a process for patterning a polysi gate on a wafer. They pattern the polysi layer using a multi-stepped rie etching process in a HDP etcher. The etching process is comprised of the following steps:

-A BARC layer is etched using a plasma comprised of (HBr-O₂), and a patterned photo resist etch mask. (They employ a first TCP power and a first bias power.);

-The hard mask is etched using a fluorocarbon gas, and a patterned photo resist etch mask. (They employ a second TCP power, and a second bias power.);

-The photo resist etch mask, and the BARC layer are stripped in an O₂ based plasma. (They employ a third TCP power, and a third bias power.); and

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-The polysi layer is etched in a (Cl₂-O₂-He-Br) based plasma. (They employ a fourth TCP power, and a fourth bias power.)

This is discussed specifically in columns 1-8; and discussed in general in columns 1-12.

This is shown in figures 1-5.

It would have been inherent that the fluorocarbon based plasma (i.e.-C₂F₆ plasma) which is used to plasma etch the hard mask in the process taught above would have formed a polymeric residue on both interior surfaces of the plasma etching chamber as well as the substrate. It would have further been inherent that the O₂ based stripping plasma used in the process taught above to strip the BARC layer, and the photo resist layer would have also have stripped the polymeric etch residues. The examiner cites the case law listed below of interest to the applicant in this regard.

In re Swinehart (169 U.S.P.Q. 226 (CCPA)) and In re Best (195 U.S.P.Q. 430 (CCPA)) state that when an examiner has reasonable basis for believing that functional characteristics asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be inherent characteristics of the prior art, the examiner possesses the authority to require an applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied upon.

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19. Claims 1-3, 6-25, 34-38, 51-56, and 59-70 are rejected under 35 U.S.C. 102(b) as being anticipated by Keller (5,346,586).

Keller discloses a process for forming a W polycide gate structure on the surface of a wafer using a multi-stepped plasma etching process in which all process steps are conducted sequentially in the same HDP plasma etcher. The process is comprised of the following steps:

- A photo resist/SiO₂/WSi₂/polysil/SiO₂ laminate structure is formed onto the surface of the wafer.;
- The photo resist layer is patterned to form an etch mask.;
- The SiO₂ layer is rie etched in a plasma comprised of CF₄-CHF₃ using the patterned photo resist etch mask as an etch mask.;
- The photo resist etch mask is stripped in an O₃ based plasma.;
- The WSi₂ layer is rie etched in a plasma comprised of (SF₆-He-O₂).;
- The polysil layer is rie etched in a plasma comprised of (HBr-O₂).; and
- The polysil layer is over etched in a plasma comprised of (HBr-O₂-Cl₂-He).

This is discussed specifically in columns 3-6; and discussed in general in columns 1-8.

This is shown in figures 1-2.

It would have been inherent that the CF₄-CHF₃ plasma which is used to pattern the SiO₂ layer would have formed polymeric etch residues on both the surface of the wafer as well as on the interior surfaces of the plasma etcher. It would have been inherent that the O₃ plasma used to

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strip the photo resist etch mask would have also removed the polymeric etch residues. The examiner cites the case law listed above of interest to the applicant in this regard.

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

22. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of the references as applied in any of paragraphs 18 or 19 above.

The references as applied in any of paragraphs 18 or 19 above fail to disclose the following aspects of applicant's claimed invention:

-the specific usage of N2 as an inert gas diluent in the plasma ashing step

It would have been obvious to one skilled in the art to employ N2 as an inert gas diluent in the O2 plasma ashing step or the O3 plasma ashing step in any of the processes taught above

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based upon the following. The usage of N2 as an inert gas diluent is conventional or at least well known in the plasma ashing arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for ashing the layers in any of the processes which are taught above to the specific means which are taught above.


23. Claims 57-58 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A.

Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -306-3186.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.


George A. Goudreau/gag

Primary Examiner

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